

A Comparison of the Red Green Blue Air Mass Imagery and Hyperspectral Infrared Retrieved Profiles

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The Red Green Blue (RGB) Air Mass imagery is derived from multiple channels or paired channel differences. Multiple channel products typically provide additional information than a single channel can provide alone. The RGB Air Mass imagery simplifies the interpretation of temperature and moisture characteristics of air masses surrounding synoptic and mesoscale features. Despite the ease of interpretation of multiple channel products, the combination of channels and channel differences means the resulting product does not represent a quantity or physical parameter such as brightness temperature in conventional single channel satellite imagery. Without a specific quantity to reference, forecasters are often confused as to what RGB products represent. Hyperspectral infrared retrieved profiles of temperature, moisture, and ozone can provide insight about the air mass represented on the RGB Air Mass product and provide confidence in the product and representation of air masses despite the lack of a quantity to reference for interpretation.

This study focuses on RGB Air Mass analysis of Hurricane Sandy as it moved north along the U.S. East Coast, while transitioning to a hybrid extratropical storm. Soundings and total column ozone retrievals were analyzed using data from the Cross-track Infrared and Advanced Technology Microwave Sounder Suite (CrIMSS) on the Suomi National Polar Orbiting Partnership satellite and the Atmospheric Infrared Sounder (AIRS) on the National Aeronautics and Space Administration Aqua satellite along with dropsondes that were collected from National Oceanic and Atmospheric Administration and Air Force research aircraft. By comparing these datasets to the RGB Air Mass, it is possible to capture quantitative information that could help in analyzing the synoptic environment enough to diagnose the onset of extratropical transition. This was done by identifying any stratospheric air intrusions (SAIs) that existed in the vicinity of Sandy as the wind field expanded and the cloud pattern evolved into an atypical pattern.